SEGA OF AMERICA, INC.
Consumer Products Division

Rex Sabio
242

IC BD 32M SRAM + 256K BUP 32X R/D
837-11068
User's Manual

Doc # MAR-46-081594

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1.0 Overview

This is one of the cards used in developing software for the Mega Drive / 32X Below is a list of its main features

1. 32 Mbit (4 Mbyte) of SRAM mounted on the card
   The SRAM chip used by this card uses a Hitachi HM628128ALFP series or equivalent product Access time uses a device of 100 ns or less The SRAM is backed up by a battery

2. SRAM with a 1-Mbyte (maximum) battery backup function mounted for data memory. Select from 256 Kbit, 512 Kbit and 1 Mbit settings Factory setting at shipment is 256 Kbits

3. Using the bank select function, memory can be selected arbitrarily and accessed in 4 Mbit units Bank numbers are valid from 0H to 7H.

4. Power Supply DC +5V is supplied from the main unit

5 Designed memory write protect/write enable registers Memory content is protected from unnecessary memory write access to the program area The initial status immediately after the power on is the write protect status

6 Includes LED status indicator function.
   Has a function to indicate low battery warning and data retention voltage abnormalities via LEDs The battery is used in memory write enable and backup

7. Includes memory mode switching function.
   Can handle the conventional Mega Drive 16 Mbit mode through a switch.

Reusable 2.2.2

2.0 Main Specifications

Product Number	837-11068
Print Circuit Number	171-6865
Memory Capacity	SRAM 32 Mbit (program area) SRAM 1 Mbit (data area) 256 Kbits when shipped from factory (512 Kbit/1 Mbit switch setting is possible)
Word Length	1 word 16 bits
Memory Expandability	Format Bank Select
I/O Specifications	Conforms to Mega Drive, cartridge, connector specifications
Card Dimensions	95.5 (W) 165 (H) mm
Pins Used	General logic pins: TTL, LSI, IC
equivalent product	SRAM: HM628128ALFP-10 (Hitachi)
	Custom IC: 315-5709 (Sega)
	Battery: CR2032 (Sony) equivalent product ML-2016 (Sanyo) equivalent product
	Other: Electrolytic capacitor, chip capacitor, battery socket, DIP switch, etc.
Power supply	DC +5V
Temperature Range	5°C ~ 40°C
Relative Humidity	80% RH or less

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3.0 Description of Functions

The SRAM card is managed by partitioning the memory address in 4 Mbits (bank 0 ~ bank 7, 32 Mbits) The Mega Drive cartridge area is partitioned into eight areas, each having 4 Mbits. Only area 0 with vector is fixed, and to the remaining seven areas, any bank can be allocated. Banks are specified by the bank setting registers (Mega DriveA130F1H ~ A130FFH odd addresses)

Bit 0 of register 0 is the address following 200000H used in switching the ROM side /backup RAM side. Bit 1 of register 0 is used in setting the backup RAM write protect. Because there is no bank for the backup RAM, addresses after 200000H become directly backup RAM area.

Bank numbers written in register 1 through register 7 correspond to their respective areas 1 through 7. Bank numbers can be set from 0 to 63, however with the RAM card, only the RAM installed bank numbers are effective. When 32 Mbits are loaded, only bank numbers from 0 to 7 are effective. The area will not function properly for any other setting.

When the power is turned on or reset, the cartridge area becomes 32 Mbit ROM mode (area 1 ~ area 7 : bank 1 ~ bank 7) space and write protect for the backup RAM is turned off. In this way allocating all 32 Mbit address space to the MD cartridge area is called the 32M mode.

The next page shows the relationship between the MD cartridge area and bank setting register.

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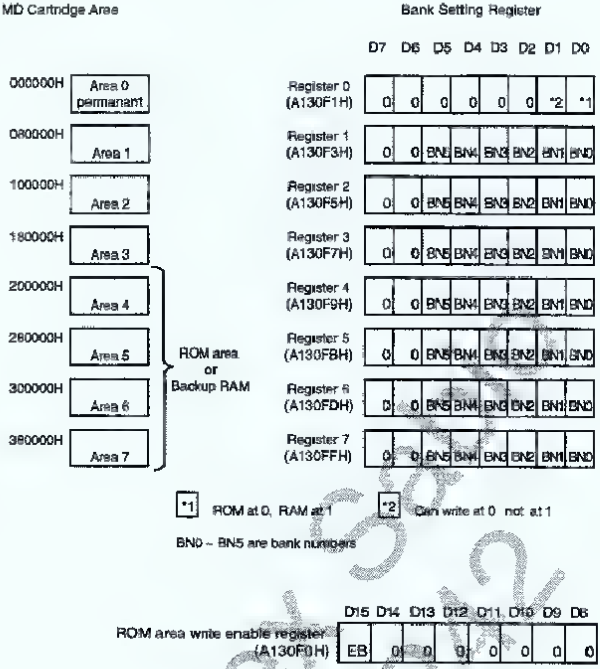

EB ROM at 0 Area write disable (cannot write)
Status when power is turned on or reset.

EB ROM at 1 Area write enable (can write)
LED 1 flashing status.

Note: This register is write only

Note: The operation of this register differs from the operation of the conventional 32M SRAM card 837-9951.

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Status when the power is turned on or reset is shown below

ROM Bank		MD Cartridge Area	
Bank 0		Area 0	000000H
Bank 1		Area 1	080000H
Bank 2		Area 2	100000H
Bank 3		Area 3	180000H
Bank 4		Area 4	200000H
Bank 5		Area 5	280000H
Bank 6		Area 6	300000H
Bank 7		Area 7	380000H

Reg 0 : 00H
Reg 1 : 01H
Reg 2 : 02H
Reg 3 : 03H
Reg 4 : 04H
Reg 5 : 05H
Reg 6 : 06H
Reg 7 : 07H

Note: Write not allowed to areas 0 through 7.

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3.1 Using the 16 Mbit ROM Mode + Backup RAM

The SRAM card accommodates bank switching at shipment, therefore, it is 32 Mbit ROM space when initialized. As a result, the SRAM card is not compatible with a cartridge with 16 Mbit or less + backup RAM (existing memory map).

Changing DIP switch settings allows the use of 16 Mbit ROM + backup RAM. Because changing the DIP switch settings automatically results in the 16 Mbit ROM + backup RAM when the power is turned on or reset, changing the bank setting register is not necessary.

This applies to 000000H ~ 1FFFFFH ROM area, backup RAM area from 200000H. This type of memory allocation is called the 16M mode. Improper operation occurs if a bank register is changed in this mode.

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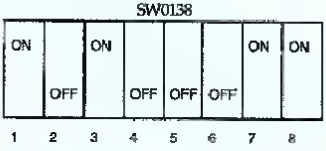
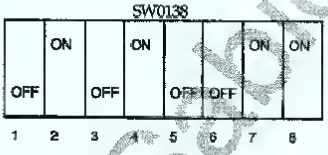
3.2 Card Switch Settings

DIP switches are designed on the card, and 32 Mbit and 16 Mbit memory modes can be selected by setting switches

32 Mode (Factory setting)



16 Mode (User setting)



3.3 Switch Descriptions

Switches 1 to 4 are used in SRAM chip select signal switching. The backup RAM capacity is determined via switches 5 and 6. The standard is 256 Kbits.

5	6	Capacity
OFF	OFF	256 Kbits
ON	OFF	512 Kbits
ON	ON	1 M

Switch 7 Bank Register operation allowed/not allowed
ON Bank Register operation allowed
OFF Bank Rregister operation not allowed

Switch 8 Option Signal connectivity switching with device consideration
ON -CART signal connected
OFF -CART signal not connected

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3.4 Status Display Function Using LEDs

This card includes functionality that displays card status using three LEDs: LED1, LED2, and LED3.

LED1:	ON	Allows write to the ROM area.
	OFF	Disallows write to the ROM area (write protect).
LED2:	ON	Replace the battery CR2032 (BATT0248).
	OFF	The battery still has ample power
LED3:	ON	Voltage is abnormal, please replace battery CR2032 (BATT0248)
	OFF	Memory data protect voltage is normal.

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242

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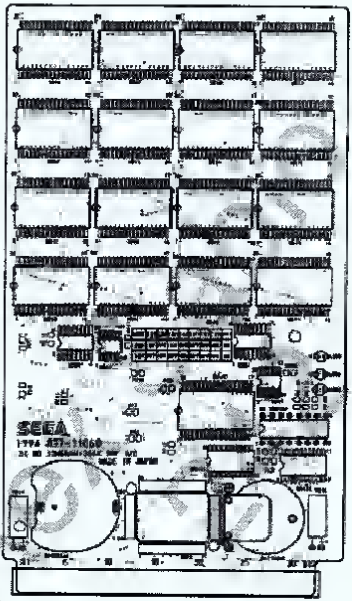
4.0 View

(Front View)

171-6865



Component Side Silk

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